

NORTH CAROLINA STATE BUILDING
CODE 1980
VOLUME II, PLUMBING

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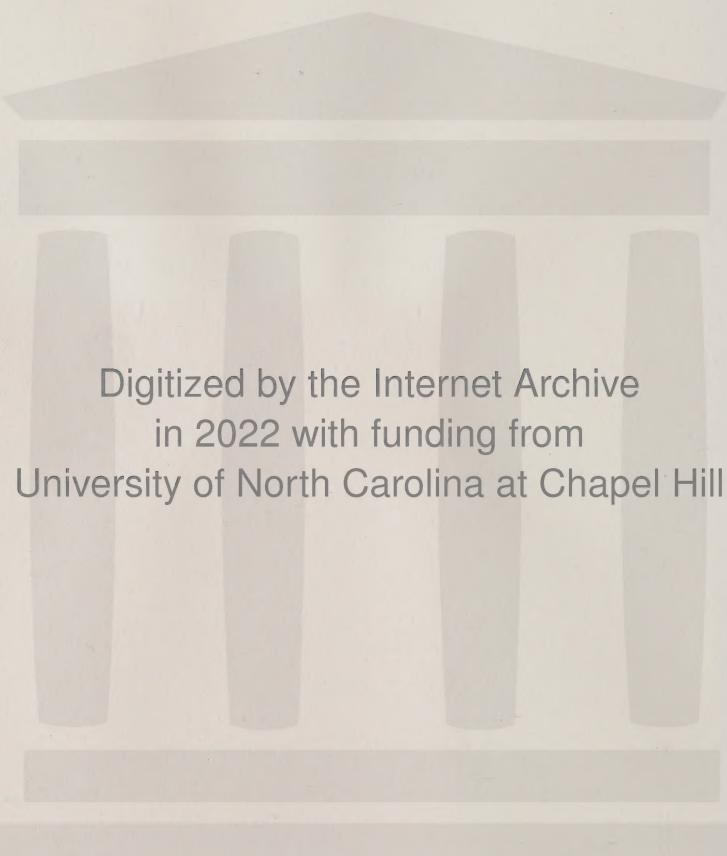
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NORTH CAROLINA STATE BUILDING CODE 1980

VOLUME II, PLUMBING

REVISION 4

This revision represents changes to the North Carolina State Building Code, Volume II, Plumbing, 1980 Edition. These are the accumulative changes of the Code through June 14, 1988. It is requested that you follow checking slip below for revision 4.

CHECKING SLIP

Replace or insert (check paragraph below) pages:

1, 3, 1-3, 1-7, 1-11, 3-1, 3-7, 4-3, 5-7, 5-9, 6-5, 9-5, 9-7, 9-9, 9-11, 10-1, 10-3, 12-15, 12-16A, 13-1, 13-5, 14-1, 15-1, 16-1.

Remove old pages of same numbers as above and at the same time you are replacing or inserting pages from the checking slip.

Changes are indicated by a vertical rule on left margin on the page they appear.

If any pages are missing or you do not receive a complete set for each North Carolina State Building Code, Volume II, Plumbing, additional copies may be purchased by notifying:

JACKIE BAKER or DIANN KIRKSEY
NORTH CAROLINA DEPARTMENT OF INSURANCE
ENGINEERING AND BUILDING CODES DIVISION
P. O. BOX 26387
RALEIGH, NORTH CAROLINA 27611
TELEPHONE 919-733-3901

NOTE: IN ORDER TO HAVE A CURRENT VOLUME II, YOU MUST HAVE:

1. 1980 EDITION OF VOLUME II, AND
2. REVISION #3 THRU MARCH 10, 1987, AND
3. REVISION #4 THRU JUNE 14, 1988

FOREWORD

North Carolina has been a pioneer in the field of Statewide Building and Fire Prevention regulations which have been enacted for the protection of the public. The Building Laws passed in 1903 and 1905 created a Building Code for materials and methods of construction in use at that time.

The General Assembly of 1933 created a Building Code Council and authorized it to, in cooperation with the Commissioner of Insurance, prepare and adopt a Building Code. The first North Carolina Building Code received the approval of the official Building Code Council and the Commissioner of Insurance in 1935 and was printed that same year. The General Assembly of 1941 ratified and adopted this edition, which was known as the 1936 Edition.

The 1936 Edition contained a State Plumbing Code. It was rewritten by the State Board of Health and the Building Code Council in 1954. The 1954 Edition was printed as Article XX of the State Code and it was bound in the 1958 Edition. The 1933 Building Code Council authorized cities and towns to make changes in the State Code as long as they were more stringent. However, many cities and towns and counties rewrote the State Code and some adopted a plumbing code of their own thus providing for different plumbing regulations in many areas of the State.

The 1957 Legislature rewrote the 1933 Building Code Council Act and re-organized and expanded the Council. All local Codes different from the State Code were required to be approved by the Council.

The technical provisions herein are taken from the 1962-1963 Edition of the Southern Standard Plumbing Code with 1964-66 Amendments published by the Southern Building Code Congress which is based mainly on the 1955 Edition of the National Plumbing Code, ASA, A40.8—1955.

The Code is presented with the hope that its use will protect the public from dangerous and unsanitary buildings and will provide Architects and Engineers a set of minimum standards to follow in designing buildings. The Building Code Council has authority to make changes in the Code when the wider use of materials and methods comply with standards set forth in the Laws. From time to time, there will be modifications and changes in the Code.

NORTH CAROLINA STATE BUILDING CODE COUNCIL

June 1, 1988

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NORTH CAROLINA DEPARTMENT OF INSURANCE

By Statute the Commissioner of Insurance has general supervision of the administration and enforcement of the North Carolina Building Code and the Engineering Division serves as the staff for the Building Code Council. Officials of the Insurance Department are:

JIM LONG
Commissioner

LEE HAUSER, P.E.
Deputy Commissioner
and Secretary
to Council

JOHN R. WIGGINS, P.E.
Chief Code Council
Engineer, Code Council
Section

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June 1, 1988

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NORTH CAROLINA STATE BUILDING CODE PUBLICATIONS

(Available from Engineering Division, Department of Insurance,
Box 26387, Raleigh, North Carolina 27611)

Volume I — GENERAL CONSTRUCTION

Volume Ib — N.C. UNIFORM RESIDENTIAL BUILDING CODE.

Volume II — PLUMBING

Volume III — HEATING, AIR CONDITIONING, REFRIGERATION AND
VENTILATION

Volume IV — ELECTRICAL

State of North Carolina Regulations for Mobile Homes

State of North Carolina Regulations for Modular Construction

(c) The Department of Labor shall have general supervision of the administration and enforcement of those sections of the Code which pertain to elevators, moving stairways, and amusement devices such as merry-go-rounds, roller coasters, and Ferris wheels. [Authority: G.S. 143-139.]

103.2—STAFF FOR BUILDING CODE COUNCIL

The Division of Engineering and Building Codes of the Department of Insurance serves as Staff for the Building Code Council. (Authority: G.S. 143-137 (c).)

103.3—RIGHT OF ENTRY

The Commissioner of Insurance and his authorized deputies in the Division of Engineering and Building Codes have the right at all reasonable hours to enter into or upon all buildings in their jurisdiction for the purpose of examination and inspection. (Authority: G.S. 69-4, 69-13, 153A-360, 153A-364, 160A-420, 160A-424, 143-139(b).)

103.4—INSPECTIONS

The Commissioner of Insurance and his authorized deputies in the Division of Engineering and Building Codes may inspect any building wherever it may be situated in the State to assist local officials in the enforcement of the Building Code. (Authority: G.S. 143-139(b).)

103.5—APPEALS

The Commissioner of Insurance and his authorized deputies (and local inspection officials and the Department of Labor with respect to provisions set forth in Section 103.1 (b) and (c) shall hear any appeals raising questions under the Code before officials attempting to enforce the same.

SECTION 104—ADMINISTRATION BY BUILDING CODE COUNCIL

104.1—COMPOSITION OF BUILDING CODE COUNCIL

The Building Code Council consists of 12 members appointed by the Governor, including one registered architect, one licensed general contractor, one registered architect or licensed general contractor specializing in residential design or construction, one registered engineer practicing structural engineering, one registered engineer practicing mechanical engineering, one registered engineer practicing electrical engineering, one licensed plumbing and heating contractor, one municipal or county building inspector, one representative of the public who is not a member of the building construction industry, one licensed electrical contractor, one registered engineer on the engineering staff of a State agency charged with approval of plans of state-owned buildings and 1 representative of the fire service. [Authority: G.S. 143-136.]

104.2—OFFICERS

The Council shall elect from its appointed members a Chairman and Vice-Chairman. Officers shall serve for a period of two years from the date of election or until their successors are elected. [Authority: G.S. 143-137(a).]

104.3—MEETINGS

The Building Code Council shall meet regularly the *second Tuesday in March, June, September, and December*. Special meetings may be called by the Chairman. Any five members of the Council shall constitute a quorum. Information concerning the exact time and place of each meeting shall be available from the Division of Engineering and Building Codes of the Department of Insurance during the 15 days prior to each such meeting. [Authority: G.S. 143-137(b).]

Section 105

104.4—DUTIES

The Building Code Council has the duties of adopting and from time to time amending the North Carolina State Building Code, of approving local building regulations which deviate from the State Building Code, of hearing and deciding appeals from decisions of any enforcement agency with reference to provisions of the Code and of recommending appropriate statutory changes and improvements in administrative practices other than administrative.

104.5—STAFF AND PERSONAL

The Division of Engineering and Building Codes of the Department of Insurance serves as the staff for the Council. (Authority: G.S. 143-137 (c).)

SECTION 105—ADMINISTRATION BY LOCAL BUILDING OFFICIALS

105.1—ORGANIZATION & JURISDICTION OF LOCAL INSPECTORS

(a) Initial responsibility for administration and enforcement of the Code has been allocated by the General Statutes to local inspection officials, under the general supervision of the State officials designated in Section 103.1. Local inspection officials may be organized and have jurisdiction as specified in the subsections below:

(b) A City Inspection Department, with jurisdiction over areas within the city limits, over any extraterritorial area as to which the city has jurisdiction pursuant to Section 160A-360 of the General Statutes or any special act of the General Assembly, and over any areas as to which the city has contracted with another unit to enforce the Code:

(c) A County Inspection Department, with jurisdiction over unincorporated areas outside any city's jurisdiction, over any portion of a city's jurisdiction wherein the City Council has requested the county to enforce the Code, and over any areas as to which the county has contracted with another unit to enforce the Code;

(d) A Joint Inspection Department created by two or more units of local government, with authority over the legal jurisdiction of all units supporting the joint department. (Authority: G.S. 143-139, 153A-351, 153A-353, 160A-360, 160A-411, 160A-413, 160A-461, 160A-462.)

105.2—DUTIES OF LOCAL INSPECTORS, GENERAL

Local Inspection Departments shall receive applications for permits, issue or deny permits, make necessary inspections, issue or deny certificates of compliance, issue orders to correct violations, revoke permits, bring judicial actions against actual or threatened violations, keep adequate records, and take any other actions that may be required in order adequately to enforce the Code. (Authority: G.S. 153A-352, 160A-412.)

105.3—PERMITS REQUIRED

(a) *New Building*: No person shall commence or proceed with the installation of any plumbing system covered by this Code without first applying for and receiving one or more permits covering all work to be done.

(b) *Existing Buildings*: No person shall commence or proceed with reconstruction, alteration, repair, moving or demolition of any existing plumbing system without first applying for and receiving one or more permits covering all such work. (Reference: Chapter X, Section 2604. (Volume 1))

(c) *A permit is required whenever the use of an existing building is changed*. This permit shall not be issued until the inspector has made an inspection of the building to determine whether it must be altered or repaired in order to meet the requirements of the Code with respect to the new use. (G.S. 143-138 (b), 143-139, 153A-357, 160A-417.)

thereof, and in event defective materials or workmanship are revealed by such tests, the said owner or agent shall immediately repair the plumbing system in accordance with the directions of the plumbing inspector.

(c) *Materials and Labor for Tests:* All equipment, material, power and labor necessary for inspection and tests shall be furnished by the master plumber or installer.

105.8—RIGHT OF ENTRY

Authorized personnel of a local Inspection Department shall have a right to the extent provided by the N.C. General Statutes to enter on any premises within the Department's jurisdiction, including entry into or upon all buildings or structures, for the purpose of inspection or other enforcement action, upon presentation of proper credentials. (Authority: G.S. 69-4, 69-13, 143-139, 153A-360, 153A-364, 160A-420, 160A-424.)

105.9—STOP ORDERS

(a) Whenever any building or structure or part thereof is being constructed, reconstructed, altered, repaired, or demolished in a hazardous manner, or in substantial violation of this Code or any other applicable State or local building law, or in a manner that endangers life or property, the appropriate inspector may order the specific part of the work that is in violation or presents such a hazard to be immediately stopped.

(b) The stop order shall be in writing, directed to the person doing the work, and shall state the specific work to be stopped, the specific reasons therefor, and the conditions under which the work may be resumed.

(c) The owner or builder may appeal from a stop order to the North Carolina Commissioner of Insurance within a period of five days after the order is issued. Notice of the appeal shall be given in writing to the Commissioner of Insurance, with a copy to the local Inspection Department. The Commissioner shall promptly conduct a hearing at which the appellant and the inspector issuing the order shall be permitted to submit relevant evidence, and shall rule on the appeal as expeditiously as possible. Pending the ruling by the Commissioner of Insurance on an appeal, no further work shall take place in violation of the stop order.

(d) Violation of a stop order shall constitute a misdemeanor. (Authority: G.S. 143-139, 153A-361, 160A-421.)

105.10—REVOCATION OF PERMITS

The inspection department may revoke and require the return of any permit by notifying the permit holder in writing stating the reason for the revocation. Permits shall be revoked for any substantial departure from the approved applications, plans, or specifications; for refusal or failure to comply with the requirements of this Code or any other applicable State or local laws; or for false statements or misrepresentations made in securing the permit. Any permit mistakenly issued in violation of this Code or any other applicable State or local law may also be revoked. (Authority: G.S. 143-137, 153A-362, 160A-422.)

105.11—CERTIFICATES OF COMPLIANCE

(a) At the conclusion of all work done under a permit, the appropriate inspector or inspectors shall make a final inspection, and if they find the completed work complies with this Code and all other applicable State and local laws and with the terms of the permits, the Inspection Department shall issue a certificate of compliance.

(b) No new building or structure or part thereof may be occupied, and no addition or enlargement of an existing building or structure may be occupied, and no existing building or structure that has been altered or moved may be occupied, and no existing building or structure whose use has been changed may be occupied, until the Inspec-

Section 106

tion Department has issued a certificate of compliance.

(c) A temporary certificate of compliance may be issued permitting occupancy for a stated period of specified portions of the building or structure that the Inspection Department finds may safely be occupied prior to final completion of the entire building or structure.

(d) Occupying a building or structure in violation of this section shall constitute a misdemeanor. (Authority: G.S. 143-139, 153A-363, 160A-423.)

105.12—RECORDS AND REPORTS

(a) Local Inspection Departments shall keep complete, permanent, and accurate records in convenient form of all applications received, permits issued, inspections and reinspections made, defects found, certificates of compliance granted, and all other actions of the Department.

(b) Periodic reports shall be submitted to the local governing board and to the Commissioner of Insurance as they shall by ordinance, rule, or regulation require. (Authority: G.S. 143-139, 153A-373, 160A-433.)

105.13—CONDEMNATION OF UNSAFE BUILDINGS

(a) Whenever a local inspector finds any defects in a building, or finds that the building or structure has not been constructed in compliance with this Code or other applicable State and local laws, or that a building because of its condition is dangerous or contains fire hazardous conditions, it is his duty to notify the owner or occupant of the building of its defects, hazardous conditions, or failure to comply with law. The owner or occupant shall each immediately remedy the defects, hazardous conditions, or violations of law in the property he owns.

(b) Whenever a local inspector finds conditions in a building which are especially dangerous to life, or unfit for human habitation, or constitute a nuisance, or have otherwise been defined as hazardous and contrary to the public interest by a local ordinance, he shall immediately initiate actions in accordance with appropriate statutory authority to vacate, demolish, close, repair, or otherwise correct such conditions.

(c) Removal of a notice condemning a building as unsafe or failure to comply with a valid order to correct such conditions shall constitute a misdemeanor; in addition, the Inspection Department may bring appropriate actions to prevent violations, require corrective action, or prevent occupancy of the building or structure. (Authority: G.S. 69-13, 143-138 (h), 143-139, 153A-121, 153A-122, 153A-123, 153A-365 to 153A-372, 160A-174, 160A-175, 160A-193, 160A-425 to 160A-432, 160A-441 to 160A-450.)

SECTION 106—APPEALS

106.1—APPEALS—GENERAL

All appeal proceedings heard pursuant to this Section shall comply with the provisions, insofar as applicable, of G.S. 143-140, 143-141, 153A-374, 160A-434, and Article 3 and 4 of G.S. Chapter 150A (the Administrative Procedure Act).

106.2—APPEALS TO THE COMMISSIONER OF INSURANCE OR DEPARTMENT OR LABOR

(a) Any person desiring to raise any questions under the State Building Code arising out of a decision of a local inspector shall be entitled to a full hearing before the Commissioner of Insurance or Department of Labor as to the provisions which they are charged with administering.

(b) Anyone desiring to appeal from any order, decision, or determination by a member of a local Inspection Department pertaining to this Code shall file a written notice

(d) The proposed amendment or amendments shall comply with the *standards set forth in G.S. 143-138(c)* and reference to the particular standards and sections involved shall be set forth in the request for hearing.

(e) The original request for a hearing shall be signed by the party or parties or their duly authorized agent submitting same and be received at least 35 calendar days before date of hearing to be considered.

Rule 3—Time of Hearing—Upon the proper filing of a request for hearing in accordance with these rules, the Chairman of the Building Code Council shall cause a hearing to be held within a reasonable time not to exceed six months; said hearing shall be open to the public.

Rule 4—Notice of Hearing—The Chairman of the Building Code Council shall fix the time and place for said public hearing and shall cause notice of the hearing to be given as follows:

(a) Notice in writing to the party or parties or their duly authorized agents requesting the hearing not less than fifteen days prior to the hearing;

(b) Notice of public hearing by publication as required by G.S. 143-138(a);

(c) Not less than *ten days notice* in writing to all members of the Building Code Council.

Rule 5—Improper Filing of Request for Hearing—When a request for hearing is filed under this Section other than in accordance with these Rules, the staff of the Building Code Council shall notify the applicant of proper procedure to follow.

107.3—PRINTING AMENDMENTS

Amendments to the State Building Code will be printed once each year as an accumulative supplement. (Authority: G.S. 143-138 (g).)

SECTION 108—APPROVAL OF LOCAL ORDINANCES

108.1—LOCAL CODES AND ORDINANCES TO BE APPROVED

Section 143-138(e) of the General Statutes requires that any city or county building code or building rules and regulations governing construction must be approved by the Building Code Council in order to be legally effective. In the interest of standardization of local codes and ordinances throughout the State, to facilitate understanding of requirements by inspectors, architects, engineers, builders, and the general public, and to encourage free competition among members of the construction industry throughout the State, the Council announces a policy of approving only those local deviations from the State Building Code for which a local government presents compelling evidence of necessity.

108.2—PROCEDURAL RULES

The following procedural rules shall apply when any city or county makes application to the Building Code Council requesting approval of a local ordinance:

Rule 1

(a) An *original and 14 copies* of the request for the hearing and proposed local ordinance shall be filed with the Building Code Council in care of the Division of Engineering, Department of Insurance, Box 26387, Raleigh, North Carolina.

(b) Request for the hearing must be signed by a *responsible official* of the city or county.

(c) Request for hearing and copies of ordinance must be sent in at least 35 calendar days before date of hearing to be acted on (Regular meetings of Council are held the *second Tuesday in March, June, September, and December*.)

Section 109

Rule 2

All Local ordinances (including those relating to *Building construction, plumbing, heating and electrical*) must be divided into three major sections:

1. Local *administrative regulations*, fees, etc. dealing with administration of the Code. These regulations should not conflict with State Laws.

2. Reference to an *adoption of the State Building Code* (including general construction, plumbing, heating and electrical). Reference also should be made to adoption of the recommended Uniform Residential Code for dwellings if it is desired to have regulations applicable to dwellings.

3. The *proposed amendments to the State Building Code* (including general construction, plumbing, heating and electrical) must be set forth in full, designating page and paragraph reference to that section of the State Building Code proposed to be modified or supplemented.

Rule 3

The *reasons* for requesting the change to the State Code must be shown. Reference to sections of nationally recognized standards set forth in G.S. 143-138(c) should be made to support this request.

Rule 4

After approval of the Council and local administrative body, two copies of all amendments must be sent to the Secretary of the Council in the form they are to be distributed, one for the *Council's file* and the other to be stamped approved by the Building Code Council and returned for *local file*.

SECTION 109—ALTERNATE MATERIALS AND ALTERNATE METHODS OF CONSTRUCTION

“Although a certain material, or a particular method of construction, is specifically prescribed by the Code, this Code is not intended to prevent the use of a material, or method of construction, different from the material, or method of construction specifically prescribed by the Code, provided any such alternate material or method of construction has been approved and its use authorized by the building official. The building official shall approve any such alternate material, or method of construction, provided the building official, in his sole discretion, finds that the proposed alternate material, or method of construction is, for the purpose intended, at least the equivalent of that specifically prescribed by the Code in quality, strength, effectiveness, fire-resistance, durability and safety. The building official may require that sufficient evidence or proof be submitted to substantiate any claim that may be made regarding its use, and, in the opinion of the building official, the evidence and proof are not sufficient to justify his approval, the aggrieved party may refer the entire matter to the Building Code Council.”

SECTION 110—VIOLATIONS AND PENALTIES

Any person who shall be adjudged to have violated the North Carolina State Building Code shall be guilty of a misdemeanor and shall upon conviction be liable to a fine not to exceed \$50.00 for each offense. Each thirty days that such violation continues shall constitute a separate and distinct offense. (Authority: G.S. 143-138 (h).)

SECTION 111—VALIDITY

If any section, subsection, sentence, clause or phrase of this Code is for any reason held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this Code.

NORTH CAROLINA STATE BUILDING CODE

VOLUME II — PLUMBING

CHAPTER III

DEFINITIONS

301 General

301.1. For the purpose of this code, the following terms shall have the meaning indicated in this chapter.

301.2 No attempt is made to define ordinary words which are used in accordance with their established dictionary meaning except where the word has been loosely used and it is necessary to define its meaning as used in this code to avoid misunderstanding.

301.3 Because the primary purpose is to define terms rather than words, the definitions are arranged alphabetically according to the first word of the term rather than the noun.

302. Definition of Terms.

Accessible. Having access thereto, but which first may require the removal of an access panel or similar obstruction.

Administrative Authority. See Plumbing Official.

Air Gap. An Air gap in a water-supply system is the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood-level rim of the receptacle.

Anchors. See Supports.

Approved. Approved means accepted or acceptable under an applicable specification stated or cited in this code, or accepted as suitable for the proposed use under procedures and powers of the Plumbing Official.

Area Drain. An area drain is a receptacle designed to collect surface or rain water from an open area.

Backflow. Backflow is the flow of water or the liquids, mixtures, or substances into the distributing pipes of a potable supply of water from any source or sources other than its intended source. (See back-siphonage.)

Backflow Connection. Backflow connection or condition is any arrangement whereby backflow can occur.

Backflow Preventer. A backflow preventer is a device or means to prevent backflow into the potable water system.

Back-Siphonage. Back-siphonage is the flowing back of used, contaminated, or polluted water from a plumbing fixture or vessel into a water-supply pipe due to a negative pressure in such pipe. (See backflow.)

Battery of Fixtures. A "battery of fixtures" is any group of two or more similar adjacent fixtures which discharge into a common horizontal waste or soil branch.

Section 301

Boiler Blow-Off. A boiler blow-off is an outlet on a boiler to permit emptying or discharge of sediment.

Branch. A branch is any part of the piping system other than a main, riser, or stack.

Branch, Fixture. See Fixture Branch.

Branch, Horizontal. See Horizontal Branch.

Branch Interval. A branch interval is a length of soil or waste stack corresponding in general to a story height, but in no case less than 8 feet within which the horizontal branches from one floor or story of a building are connected to the stack.

Branch Vent. A branch vent is a vent connecting one or more individual vents with a vent stack or stack vent.

Building. Means any structure built for the support, shelter or enclosure of persons, animals, chattels, or property of any kind which has enclosing walls for 50% of its perimeter. The term "building" shall be construed as if followed by the words "or part thereof". (For the purpose of this Code each portion of a building separated from other portions by a fire wall shall be considered as a separate building).

Building Classification. Building classification is the arrangement in the Building Code for the designation of buildings in classes based upon their use of occupancy.

Building Drain. The building (house) drain is that part of the lowest piping of a drainage system which receives the discharge from soil, waste, and other drainage pipes inside the walls of the building connecting with the main soil stack or vent stack which shall be located at the group or battery of fixtures where the greatest fixture unit load occurs, and conveys it to the building (house) sewer beginning 10 feet outside the building wall. A cleanout shall be installed at that point and extended to finish grade.

Building Sewer. The building (house) sewer is that part of the horizontal piping of a drainage system which extends from the end of the building drain and which receives the discharge of the building drain and conveys it to a public sewer, private sewer, or individual sewage-disposal system.

Building Storm Drain. A building (house) storm drain is a drain used for conveying rain water, surface water, ground water, subsurface water, condensate, cooling water, or other similar discharge to a building storm sewer, extending to a point not less than 10 feet outside the building wall.

Building Storm Sewer. A building (house) storm sewer is the extension from the building storm drain to the public storm sewer, or other point of disposal.

Building Subdrain. A building (house) subdrain is that portion of a drainage system which cannot drain by gravity into the building sewer.

Building Trap. A building (house) trap is a device, fitting, or assembly of fittings installed in the building drain to prevent circulation of air between the drainage system of the building and the building sewer.

Plumbing Official. The plumbing official is the individual official, board, department, or agency established and authorized by a state, county, city or other political subdivision created by law to administer and enforce the provisions of the plumbing code as adopted or amended.

Plumbing Inspector. See Plumbing Official.

Plumbing System. The plumbing system includes the water-supply and distribution pipes; plumbing fixtures and traps; soil, wastes, and vent pipes; building drains and building sewers including their respective connections, devices, and appurtenances within the property lines of the premises, and water-treating or water-using equipment.

Pool. A pool is a water receptacle used for swimming or as a plunge or other bath, designed to accommodate more than one bather at a time.

Potable Water. Potable water is water which is satisfactory for drinking, culinary, and domestic purposes, and meets the requirements of the Health Authority having jurisdiction.

Private or Private Use. In the classification of plumbing fixtures, private applies to fixtures in residences or apartments and to fixtures in private bathrooms of hotels and similar installations where the fixtures are intended for the use of a family or an individual.

Private Sewer. A private sewer is a sewer privately owned and not directly controlled by public authority.

Public or Public Use. In the classification of plumbing fixtures, public applies to fixtures in general toilet rooms of schools, gymnasiums, hotels, railroad stations, public buildings, bars, public comfort stations, and other installations (whether pay or free) where a number of fixtures are installed so that their use is similarly unrestricted.

Public Official. See Plumbing Official.

Public Sewer. A public sewer is a common sewer directly controlled by public authority.

Readily Accessible. Direct access without requiring the use of tools for removing or moving any panel, door or similar obstruction.

Relief Vent. A relief vent is a vent the primary function of which is to provide circulation of air between drainage and vent systems.

Return Offset. A return offset is a double offset installed so as to return the pipe to its original alignment.

Revent Pipe. A revent pipe (sometimes called an individual vent) is that part of a vent pipe line which connects directly with an individual waste or group of wastes, underneath or back of the fixture and extends either to the main or branch vent pipe.

Rim. A rim is an unobstructed open edge of a fixture.

Riser. A riser is a water-supply pipe which extends vertically one full story or more to convey water to branches or fixtures.

Roof Drain. A roof drain is a drain installed to receive water collecting on the surface of a roof and to discharge it into the leader (downspout).

Section 301

Roughing-In. Roughing-in is the installation of all parts of the plumbing system which can be completed prior to the installation of fixtures. This includes drainage, water-supply, and vent piping, and the necessary fixture supports.

Sand Interceptor. See Interceptor.

Sanitary Sewer. A sanitary sewer is a pipe which carries sewage and excludes storm, surface and ground water.

Second Hand. Second hand as applied to material or plumbing equipment is that which has been installed, used, and removed for subsequent relocation and use.

Separator. See Interceptor.

Septic Tank. A septic tank is a watertight receptacle which receives the discharge of a drainage system or part thereof, and is designed and constructed so as to separate solids from the liquid, digest organic matter through a period of detention, and allow the liquids to discharge into the soil outside of the tank through a system of open-joint or perforated piping, or disposal pit. For additional information see N.C. Division of Health Services Bulletin 519 for tanks of 3000 gallons capacity or less. Above 3000 gallons capacity refer to N.C. Department of Water and Air Resources guidelines.

Sewage. Sewage is any liquid waste containing animal or vegetable matter in suspension or solution, and may include liquids containing chemicals in solution.

Shall. The word "shall" is a mandatory term.

Side Vent. A side vent is a vent connecting to the drain pipe through a fitting at an angle not greater than 45 deg. to the vertical.

Size of Pipe and Tubing. See Diameter.

Slope. See Grade.

Soil Pipe. A soil pipe is any pipe which conveys the discharge of water closets or fixtures having similar functions, with or without the discharge from other fixtures, to the building drain or building sewer.

Soil Vent. See Stack Vent.

Special Waste Pipe. See Chapter 9.

Stack. A stack is the vertical main of a system of soil, waste, or vent piping.

Stack Group. Stack group is a term applied to the location of fixtures in relation to the stack so that by means of proper fittings, vents may be reduced to a minimum.

Stack Vent. A stack vent (sometimes called a waste vent or soil vent) is the extension of a soil or waste stack above the highest horizontal drain connected to the stack.

Stack Venting. Stack venting is a method of venting a fixture or fixtures through the soil or waste stack.

407.5 Backfilling.

Adequate precaution shall be taken to insure proper compactness of backfill around piping without damage to such piping.

407.6 Backfill Material.

Trenches shall be backfilled in thin layers to 12 in. above the top of the piping with clean earth which shall not contain stones, boulders, cinderfill, or other materials which would damage or break the piping or cause corrosive action. Mechanical devices such as bulldozers, graders, etc., may then be used to complete backfill to grade. Fill shall be properly compacted.

408 Structural Safety.

408.1

In the process of installing or repairing any part of a plumbing and drainage installation, the finished floors, walls, ceilings, tile work, or any other part of the building or premises which must be changed or replaced shall be left in a safe structural condition in accordance with the Requirements of the Building Code or as approved by the Plumbing or Building Official.

409 Workmanship.

409.1

Workmanship shall conform to generally accepted good practice.

410 Protection of Pipes.

410.1 Breakage and Corrosion.

Pipes passing under or through walls shall be protected from breakage. Pipes passing through or under cinder or concrete or other corrosive material shall be protected against external corrosion by protective coating, wapping, or other means which will prevent such corrosion.

410.2 Cutting or Notching.

No structural member shall be weakened or impaired by cutting, notching, or otherwise, except to the extent permitted by the Plumbing or Building Official.

410.3 Pipes Through Footings or Foundation Walls.

A soil or waste pipe, or building drain passing under a footing or through a foundation wall shall be provided with a relieving arch; or there shall be built into the masonry wall an iron pipe sleeve two pipe sizes greater than the pipe passing through or as may be approved in writing by the Plumbing Official.

410.4 Freezing.

The top of sewer or waste pipes, installed below grade outside the building, shall be below the frost line or a minimum of 12 inches below finished grade whichever is greater. Sewer, waste and water pipes installed in a wall exposed to the exterior or an unconditioned space shall be located on the heated side of the wall insulation. Water piping installed in an unconditioned attic or unconditioned utility room shall be insulated with an insulation having a minimum R factor of 7.4.

Section 412

Note: These provisions are minimum requirements which have been found suitable for normal weather conditions. Abnormally low temperatures for extended periods may require additional provisions to prevent freezing.

411 Damage to Drainage System or Public Sewer.

411.1

It shall be unlawful for any person to deposit by any means into the building drainage system or into a public or private sewer any ashes; cinders; rags; inflammable, poisonous, or explosive liquids; gasses; oils; grease; or any other material which would or could obstruct, damage, or overload such system or sewer.

412 Industrial Wastes.

412.1

Wastes detrimental to the public sewer system or detrimental to the functioning of the sewage-treatment plant shall be treated and disposed of as directed by the Plumbing Official or other authority having jurisdiction.

413 Sleeves.

413.1

Annual space between sleeves and pipes shall be filled or tightly caulked with coal tar or asphaltum compound, lead, or other material found equally effective and approved as such by the Plumbing Official.

414 Ratproofing.

414.1 Exterior Openings.

All exterior openings provided for the passage of piping shall be properly sealed with snug fitting collars of metal or other approved ratproof material securely fastened into place.

414.2 Interior Openings.

Interior openings through walls, floors, and ceilings shall be ratproofed as found necessary by the Plumbing Official.

415 Used or Second-Hand Equipment.

415.1

It shall be unlawful to purchase, sell, or install used equipment or material for plumbing installations unless it complies with the minimum standards set forth in this Code.

416 Condemned Equipment.

416.1

Any plumbing equipment condemned by the Plumbing Official because of wear, damage, defects, or sanitary hazards shall not be re-used for plumbing purposes.

418 Piping in Relation to Footings.

MATERIALS	SEE SECTIONS 501.3 & 504.2			OTHER STANDARDS & REMARKS
	ANSI	ASTM	FS	
Concrete Reinforced Culverts		C-76-72		
Concrete Perforated		C-44-68		CS-270-65 & NSF Seal of Approval *See Sections 504.2 and 1302.1
Concrete Drain Tile		C-412-72		CS-270-65 & NSF Seal of Approval *See Sections 504.2 and 1302.1
Plastic Pipe & Fittings				NSF Seal of Approval CS-272-65 5 NSF Seal of Approval *See Sections 504.2 and 1302.1
SRP—Pipe & Fittings				NSF Seal of Approval CS-272-65 5 NSF Seal of Approval *See Sections 504.2 and 1302.1
WW-P-00380				NSF Seal of Approval CS-272-65 5 NSF Seal of Approval *See Sections 504.2 and 1302.1
For Interior DWV, Indirect Waste, Sanitary Sewers and Interior Storm Water Systems:				
abs-DWV Pipe Sch. 40	B72-18.71	D-2661-73	LP-322a	
abs-DWV Fittings	B72-18.71	D-2661-73	LP-322a	
	B72-23-71	D-2235-73 D-2665-73	LP-320a	
abs-DWV Solvent Cement PVC-DWV Pipe Sch. 40				
(1) PVC-DWV, Sch. 40 Coex Cellular Core PVC		F-891-86		
PVC-DWV-Fittings		D-2665-73	LP-320a	
PVC-DWV-Solvent Cement	B72.16-71	D-2564-72		
ABS-Foam Core		F628-79		
(2) For Interior Rainwater Systems Aluminum DWV				

MATERIALS	SEE SECTIONS 501.3 & 504.2			OTHER STANDARDS & REMARKS
	ANSI	ASTM	FS	
For Outside Building Sewers, Storm Devices and Storm Sewers*				
ABS Sewer Pipe & Fittings		D2751-73		Installations Standards ASTM 2321-74* and page 5-15
Type PSP PVC Sewer Pipe and Fittings		D3033-73		Installations Standards ASTM 2321-74* and page 5-15
Type PSM PVC Sewer Pipe and Fittings		D3034-73		Installations Standards ASTM 2321-74* and page 5-15
For Exterior Storm Water, Area Drains, Subsoil Drainage and Septic Tank Fields				
ABS Sewer Pipe & Fittings		D-2751-71		NSF Std 14
ABS Solvent Cement		D-2235-67		NSF Seal Approval
PVC Sewer Pipe & Fittings		D-2729-68		NSF Std 14
Solvent cement		D-2564-67		NSF Seal Approval
Joints for Plastics Pipe and Fittings Using Flexible Elastomeric Joints				
Pressure Joints		D3139-73		See Section 602.19
Non-Pressure Joints for Drain		D3212-73T		See Section 602.19

* D2661 and D2665 Sch. 40 ABS-PVC—F628 Foam Core may also be used for this purpose if so desired.

** Class III, IV and V soils require engineered systems which are designed and supervised by a licensed architect or licensed engineer to be in compliance with ASTM 2321-74. Non-engineered use of this pipe is restricted to native soils of Class I or Class II materials (Granular sands and gravel materials and all other soils require hauled in Class I or Class II materials (Granular sands and gravel materials) for bedding 6 inches beneath the pipe, launching and initial backfill of 6 to 12 inches above the pipe. For usage under Section 1302.1, 1501.5, 1502.4, and 1502.5

MATERIALS	SEE SECTIONS 501.3 & 504.2			OTHER STANDARDS & REMARKS
	ANSI	ASTM	FS	
PLASTIC PIPE AND FITTINGS (Cont.)				
For Exterior Water Service Piping—Lawn Sprinkler Systems				
Plastic Pipe and Fittings Pressure Rated				
abs-Pipe	1208	*	B72.3-67 B72.3-71	CS 281-59 CS 254-63 and the NSF Seal of Approval *See Section 506.6
Acrylonitrile	1210		D-1527-73 D-2282-71	NSF Seal of Approval
Butadiene	2112		D-2468-68 D-2235-72	NSF Seal of Approval
Styrene	1316		D-2662-68	NSF Seal of Approval *See Section 506.6
Fittings			D-2666-67T	NSF Seal of Approval
Solvent Cement			B72.23-71	CS 197-60
PB-Pipe (*2110)			B72.19-71	CS 255-63 and the NSF Seal of Approval *See Section 506.6
Polybutylene			D-2104-71 D-2239-71a D-2737-74	NSF Seal of Approval
Tubing (2110)*		B72.1-67	LP-00315b	
PE-Pipe	2305			
Polyethylene	2306			
& Tubing	3206			
	3306			
Fittings (Insert)	3406			
PVC-Pipe	*		B72.2-67	CS 207-60 CS 256-63 & NSF Seal of Approval *See Sect. 506.6
Polyvinyl	1120		D-1785-69 D-2241-72	NSF Seal of Approval
Chloride	1220		D-2466 or D-2467-67 D2564-67	NSF Seal of Approval
Fittings			B72.16-71	D-2846-73
Solvent Cement				
For Interior Hot and Cold Water Distribution Piping				
Chloride Pipe and Fittings (CPVC)				NSF Seal of Approval
				Appendix A-2 of ASTM- 2846-73 and manufacturer's recommendations

MATERIALS	SEE SECTIONS 501.3 & 504.2			OTHER STANDARDS & REMARKS
	ANSI	ASTM	FS	
Polybutylene (PB2110) Pipe, Tubing & Fittings	D-3309			NSF Seal of Approval and Appendix C of this code.
Plastic Materials				
Acetals	D-2133-64T	LP-392a(64)		
Acrylics	D-788-63	LM-500(60)		See Section 506
Fluorocarbon	D-1457-62T	LP-403(64)		
Nylon	D-789-62T			
Ferrous Pipe & Fittings				
Cast Iron Soil Pipe & Fittings—Service Weight	-40-1.35	A-74-69	WW-P-401(51)	CS-188-59 and Amd.
Cast Iron Soil Pipe & Fittings—Extra Heavy	A-21.2-53	A-377-72	WW-P-42b(61)	CS-188-59 and Amd. 1
Cast Iron Water Pipe	A-40.5-43		WW-P-356(36)	AWWA-C 100-55
Cast Iron Pipe (threaded)	B-16.4-63	A-126-71	WW-P-501c(56)	
Cast Iron Fittings (threaded)	B-16.12-65	A-126-71	WW-P-491a(46)	
Cast Iron Drainage Fittings (threaded)	B-36.2-61	A-72-68	WW-P-441b(52)	
Wrought Iron Pipe	B-36.10-59			
Wrought Steel Iron Pipe				
Steel Pipe Black & Hot-Dipped Zinc-Coated (Galvanized) for ordinary use	B-36.20-66	A-120-72	WW-P-406b(1)(64)	

603.6 Copper and Stainless Steel Water Tube

Joints in copper and stainless steel tube shall be made in accordance with the requirements in Section 602.4 for soldered joints, Section 602.5 for flared (compression) joints or Section 602.8 for brazed joints.

603.7 Aluminum to Aluminum, Aluminum to Cast Iron

Joints between aluminum DWV pipes and aluminum DWV pipe and hubless cast iron fittings shall be made in accordance with requirements in Section 602.20.

604 Special Joints.**604.1 Copper and Stainless Steel Tube to Screwed Pipe Joints.**

Joints from copper or stainless steel tubing to threaded pipe shall be made by the use of brass adapter fittings. The joint between the copper or stainless steel tube and fitting shall be properly soldered or brazed and the connection between the threaded pipe and the fitting shall be made with a standard pipe size screw joint.

604.2 Welding or Brazing.

Brazing or welding shall be performed in accordance with requirements of recognized published standards of practice and by licensed or otherwise qualified mechanics, except when it is determined by the Plumbing Official to be equivalent procedure for the purpose of this Code.

604.3 Slip Joints.

Slip joints may be used on exposed tubular traps on the trap seal and also the inlet and outlet side of the trap. Slip joints in water piping may be used on the exposed fixture supply only.

604.4 Expansion Joints.

Expansion joints must be accessible and may be used where necessary to provide for expansion and contraction of the pipes.

604.5 Ground Joint Connections.

Ground joint connections which allow adjustment of tubing but provide a rigid joint when made up shall not be considered as slip joints.

604.6 Mechanical Pipe Couplings and Fittings

Mechanical pipe couplings and fittings in accordance with (a) and (b) below may be used for roof or storm drains, cold domestic water pipe, fire protection standpipes, and chilled and condenser water piping in air conditioning systems.

- (a) Mechanical couplings shall be with housing fabricated in two or more parts of malleable iron castings, in accordance with Federal specifications QQ-1-666C, Grade II. Coupling gasket shall be molded synthetic rubber, per ASTM D-735-61, Grade No. R615BZ. Coupling bolts shall be oval neck track head type with hexagonal heavy nuts per ASTM A-183-60.
- (b) All pipe fittings used shall be fabricated of malleable iron castings in accordance with Federal Specifications QQ-I-666C, Grade II. Where malleable fitting pattern is not available, fittings fabricated from schedule 40 steel pipe or standard wall seamless welding fittings with grooved ends may be used.

604.7 Field Formed Tee Connections

As an alternative method for a branch, a collar may be drawn from copper tubing by drilling and then drawing out the tube surface to form a collar by use of an appropriate tool for this purpose. The height of the collar shall be no less than three times the thickness of the copper tube wall.

Section 607

The collar shall be perfectly round and the space between the inside surface of the collar and the outside surface of the joining branch tube shall conform to the spacing as provided when brazing fittings are used.

An appropriate tool designed for the purpose shall be used to notch the end of the joining branch tube and to form a shoulder or dimple that will set the proper penetration depth of the branch tube into the fitting.

The brazing shall be in accordance with Section 602.8 using BCu series filler metal.

605 Unions (Screwed).

605.1 Drainage System.

Unions may be used in the trap seal and on the inlet side of the trap. Unions shall have metal-to-metal seats.

605.2 Water-Supply System.

Unions in the water-supply system shall be metal-to-metal with ground seats.

606 Water Closet, Pedestal Urinal, and Trap Standard Service.

606.1

Fixture connections between drainage pipes and water closets, floor-outlet service sinks, pedestal urinals, and earthenware trap standards, shall be made by means of brass, approved plastic, wrought copper, wrought copper alloy, hard-lead, or iron flanges, calked, soldered, or screwed to the drainage pipe. The connection shall be bolted with an approved gasket or washer or setting compound between the earthenware and the connection. The floor flange shall be set on an approved firm base. The use of commercial putty or plaster is prohibited.

607 Prohibited Joints and Connections.

607.1 Drainage System.

Any fitting or connection which has an enlargement, chamber, or recess with a ledge, shoulder, or reduction of pipe area, that offers an obstruction to flow through the drain, is prohibited.

607.2

No fitting or connection that offers abnormal obstruction to flow, shall be used. The enlargement of a 3-inch closet bend or stub to 4-inches shall not be considered an obstruction.

608 Waterproofing of Openings.

608.1

Joints at the roof, around vent pipes, shall be made water-tight by the use of lead, copper, galvanized-iron, or other approved flashings or flashing material. Exterior-wall openings shall be made water-tight.

609 Increases and Reducers.

609.1

Where different sizes of pipes, or pipes and fittings are to be connected, the proper size increases or reducers or reducing fittings shall be used between the two sizes.

lead, copper or other acceptable materials. Shower compartments located in basements, cellars, or in other rooms in which the floor has been laid directly on the ground surface need not be lined.

911.3 Public or Institutional Showers.

Floor of public shower rooms shall be drained in such a manner that no waste water from any head will pass over floor areas occupied by other bathers.

911.4 Walls.

Shower compartments shall have walls constructed of smooth, non-corrosive and non-absorbent waterproof materials to a height of not less than 6-feet above the floor.

911.5 Joints.

Built-in tubs with overhead showers shall have waterproofed joints between the tub and non-absorbent waterproof wall materials.

911.6 Shower Heads

All showers used for other than therapeutic or safety purposes shall be equipped with a flow regulating device to limit total flow to a maximum of 3 gpm per head.

912 Sinks.

912.1 Waste Outlets.

Sinks shall be provided with waste outlets not less than 1½-inches in diameter. Waste outlets may have open strainers or may be provided with stoppers.

912.2 Food Grinders.

Sinks on which a food grinder is installed shall have a waste opening not less than 3½-inches in diameter.

913 Food Waste Grinder Units.

913.1 Separate Connections.

Domestic food waste disposal units may be connected and trapped separately from any other fixture or compartment. Units may have either automatic or hand-operated water-supply control. (See paragraph 1204.)

913.2 Grease Interceptors.

No food waste grinder shall be connected through a grease interceptor.

913.3 Commercial-Type Grinders.

Commercial-type food grinders shall have an automatic water-supply and shall be provided with not less than a 2-inch waste line. Back waste shall be trapped and vented as provided in other sections of this Code.

914 Drinking Fountains.

914.1 Design and Construction.

Drinking fountains shall conform to American Standard Specifications for Drinking Fountains. (ANSI A112.11-1973.)

Section 914

914.2 Protection of Water Supply.

Stream projectors shall be so assembled as to provide an orifice elevation as specified by American Standard Air Gaps in Plumbing Systems (ASA A40.14-1942) and American Standard Backflow Preventers in Plumbing Systems (ASA A40.16-1943.)

915 Floor Drains.

915.1 Size

Floor drains shall be of a size to serve efficiently the purpose for which they are intended but in no case less than a 2 inch outlet.

915.2 Installation

Floor drains shall connect into a trap so constructed that it can be readily cleaned. They shall be equipped with removable strainers. The open area of a strainer shall be at least two-thirds of the cross sectional area of the trap to which the drain is connected.

915.3 Required Location

Floor drains shall be installed in toilet rooms which have three or more flushing type fixtures. The water seal of these floor drain traps shall be maintained by an automatic trap primer, drainage from a clear water fixture or other method acceptable to the authority having jurisdiction.

916 Dishwashing Machines.

916.1 Protection.

Domestic dishwashing machines shall meet requirements in paragraph 1204.3.

916.2 Separate Trap.

Each residential dishwasher waste shall be connected as follows:

1. Indirectly through a vented trap or a properly trapped and vented fixture; or
2. Through a wye connection into the tail piece of a sink or into the body of a disposal unit with the flexible dishwasher hose looped up to within 2" of the bottom of the counter top.

916.3 Air Gap.

Commercial dishwashing machines shall be connected through an air gap or as provided in Chapter 11 "Indirect Waste Piping and Special Wastes."

916.4 Hot Water.

Dishwashing machines or similar dishwashing equipment not in private living quarters or dwelling units shall be provided with water at 180 deg. F for sterilization.

917 Multiple Wash Sinks.

917.1 Circular Type.

Each 18-inches of wash sink circumference (circular type) shall be equivalent to one lavatory.

917.2 Straight-Line Type.

Multiple wash sinks of the straight-line type shall have hot and cold combination spouts not closer than 18-inches from adjacent similar spouts and each spout shall be considered the equivalent of one lavatory.

918 Garbage-Can Washers.

918.1 Discharge.

Garbage-can washers shall not discharge through a trap serving any other device or fixture.

918.2 Interceptor.

The discharge from a garbage-can washer shall be connected through an interceptor.

918.3 Baskets.

The receptacle receiving the wash from garbage-cans shall be provided with a basket or similar device to prevent the discharge of large particles into the building drainage system.

918.4 Connections.

Water Supply Connections shall conform to paragraph 1204.3.

919 Laundry-Trays.

919.1 Waste-Outlets.

Each compartment of a laundry-tray shall be provided with a waste-outlet not less than 1½-inches in diameter and with a stopper.

919.2 Overflow.

Laundry-tray overflows shall conform to the requirements of paragraph 903.1.

920 Washing Machines for Residences.

920.1 Protection.

Domestic washing machines shall meet requirements in Section 1204.3.

920.2 Separate Trap.

Each unit shall be separately trapped or discharge indirectly into a properly trapped and vented fixture.

921 Special Fixtures and Specialties.

921.1 Water and Drain Connections.

Baptistries, ornamental and lily pools, aquaria, ornamental fountain basins and similar constructions when provided with water supplies shall be protected from back-siphonage as required in paragraph 1204.3.

921.2 Dental Vacuum Sink.

A vacuum drain apparatus may be installed that is drained into a central vacuum system and pump which, in turn, is drained indirectly through a vented P-trap into the main drain system.

Venting of the sink is not required since all air in the drain system is drawn into the vacuum pump and vented to atmosphere at the pump.

Section 922

(Note: See Appendix "H" for Department of Insurance Guidelines for determining total occupant content and division of occupants by percentage.)

TABLE 922.2 — MINIMUM FACILITIES¹

Type of Building or Occupancy ¹⁵	Water Closets	Urinals	Lavatories	Bathtub or Showers	Drinking Fountain ¹⁶	
Dwelling or Apt. House¹⁰	1 for each Dwelling or Apartment Unit		1 for Each Apartment or Dwelling Unit.	1 for Each Apartment or Dwelling Unit.		
Schools⁶						
Elementary	1 per 60	1 per 35	1 per 30 Male	1 per 60 Persons.	1 per 75 Persons.	
Secondary	1 per 100	1 per 45	1 per 30 Male	1 per 100 Persons.	1 per 75 Persons.	
(2) Day care	1 per 15 Persons.			1 per 25 Persons.		
College—Academic	Male 1 per 100	Female 1 per 60	1 per 110 Male	Male 1 per 150	Female 1 per 100	
Office or Public Buildings ^{11, 12, 14} or Institutions (other than for patient use)	No. of Persons	No. of Fixtures M. F.	Wherever urinals are provided for men or women, one water closet less than the number specified may be provided for each urinal installed except that the number of water closets in such cases shall not be reduced to less than 2/3 of the minimum specified for men and 3/4 of the minimum specified for women.	No. of Persons 1-15 16-35 36-55 66-80 81-100 101-150	No. of Fixtures 1 2 3 4 5 6 7 8	No. of Fixtures 1 2 3 4 5 6 7 8
	1 Fixture for each 40 Additional Persons		1 Fixture for Each 45 Additional Persons.			
Manufacturing, Warehouses, Loft Buildings, Foundries and similar Establishments^{6, 11, 12}	No. of Persons	No. of Fixtures M. F.	Same substitution as above.	1-100 Persons 1 Fixture for Each 10 Persons.	1 shower for each 16 Persons exposed to excessive heat or to skin contamination with poisonous, infectious, or irritating material.	
	1-9	1		Over 100, 1 for Each 16 Persons. ¹⁷		
	10-24	2				
	25-49	3				
	50-74	4				
	75-100	5				
	1 Fixture for Each Additional 30 Employees					

(1) December 8, 1987

(2) June 14, 1988

Dormitories ⁹ ₁₁	Male: 1 for Each 10 Persons Female: 1 for Each 8 Persons Over 10 Persons, Add 1 Fixture for Each 25 Additional Males and 1 for Each 20 Additional Females.	More than 100 persons— 1 fixture for each 10 males or each 8 females plus one addi- tional fixture for each 20 additional males or each 20 additional females.	1 for Each 12 Persons. (Separate dental lava- tories should be provided in community toilet rooms. Ratio of dental lavories for each 50 persons is recommended.) Over 150 persons, add 1 fixture for each 20 Males, 1 for Each 15 Females.	1 for each 8 persons. In the case of women's dormitories, additional bathubs should be in- stalled at the ratio of 1 for each 30 females. Over 150 persons, add 1 fixture for each 20 Males, 1 for Each 15 Females.	1 for Each 75 Persons.
Theatres, Auditoriums, and Churches ¹¹	No. of Persons M. 1-100 101-200 201-400	No. of Fixtures M. 2 3 4	No. of Persons M. 1-200 201-400 401-600	No. of Fixtures M. 2 3 4	No. of Fixtures M. 1-200 201-400 401-750
	Over 400, Add 1 Fixture for Each Additional 600 Males and 1 for Each 300 Females.	Over 600, Add 1 for Additional 300 Males.	Over 750, 1 for Each Additional 500 Persons.		
Restaurant, Clubs and Lounges ¹¹	No. of Persons M. 1-60 61-150 151-300	No. of Fixtures M. 1 2 3	No. of Persons M. 1-150	No. of Fixtures M. 1	No. of Fixtures M. 1-150 161-200 201-400
	Over 300 Add 1 Fixture for Each 200 Additional Persons.	Over 150 Persons, Add One Fixture for Each 150 Men.	Over 400, 1 Fixture for Each Additional 400 Persons.		
Shopping Center and Mercantile ¹² ₁₄	No. of Persons M F	No. of Fixtures M F	No. of Males F	No. of Fixtures M F	No. of Persons M F
	1-100 101-400	1 1 1 2	50-300 301-600	1 2	1-400 401-1000
	Over 400 persons, add 1 fixture for each additional 500 males and 300 females.	Over 600, add one urinal for each additional 300 males.	Over 1000 persons, add 1 fixture for each additional 500 persons.		1 for each 1000 per- sons with a minimum of 1 fixture for each floor level.

M—Male, F—Female.

¹The figures shown are based upon one fixture being the minimum required for the number of persons indicated or any fraction thereof.²Building category not shown on this table. Will be considered separately by the Plumbing Official.³Drinking fountains shall not be installed in toilet rooms.⁴Kitchen Sinks—1 for each dwelling or apartment unit.⁵This schedule has been adopted (1958) by the National Council on Schoolhouse Construction.

¹⁶As required by the American Standard Safety Code for Industrial Sanitation in Manufacturing Establishments (ASA Z4.1-1955). Where there is exposure to skin contamination with poisonous, infectious, or irritating materials, provide 1 lavatory for each 5 persons.

¹⁷4-lineal-inches of wash sink or 18-inches of a circular basin, when provided with water outlets for such space, shall be considered equivalent to 1 lavatory.

¹⁸Laundry trays, 1 for each 50 persons. Shop sinks, 1 for each 100 persons.

¹⁹Washing machines—water and drain connections in each dwelling or apartment unit unless central washing facilities are provided for the specific use of the occupants on the premises. One (1) washer for each eight apartments.

²⁰The installation of female urinals shall be optional.

²¹For each separate building and each rentable space in shopping centers having 2500 gross square feet area and less and having 5 or less employees, one toilet room with lockable door may be provided.

²²The number of persons shall be calculated on the basis of 100 square feet of net area per person. For determining the number of fixtures required, the total number of persons shall be divided into 70% females and 30% males (40% Females & 60% Males for *Exhibition Facilities*). Net area is 70% of the total gross area of the store or leaseable areas. For mall-type centers and exhibition facilities, areas with individual *toilet facilities* and *arcade areas* are not to be included in the total gross area. Single leased spaces located in mall-type centers and *exhibition facilities* having an area of 50,000 gross square feet or more shall have individual public *toilet facilities* provided within its leased area. Restaurants, clubs, and lounges located within a mall-type center and *exhibition facility* shall have individual public *toilet facilities* sized in accordance with the proper section of this table. Public toilet facilities in mall-type centers and *exhibition facilities* other than individual *public toilet facilities* shall be located on the *arcade* and no person shall have to travel more than 200 feet to have access to a public *toilet room*. On multi-story malls and *exhibition facilities* public *toilet facilities* shall be provided on each floor level. Individual public toilets may be used as toilet facilities for employees of that specific area. For *exhibition facilities used periodically, employees in leased spaces less than 50,000 gross square feet in area may use the public toilet facilities.*

²³For each separate building and each rentable space in shopping centers having 2500 gross square feet area or less, drinking fountains are optional.

²⁴Any building of any occupancy classification which is used primarily for other purposes, may be used as temporary shelter for the homeless if it is equipped with a minimum of one water closet and one lavatory and the capacity of the building's exits meets the requirements of Section 1105.3 of Volume I for the total number of homeless persons to be housed.

General. In applying this schedule of facilities, consideration must be given to the accessibility of the fixtures. Conformity purely on a numerical basis may not result in an installation suited to the need of the individual establishment. For example, schools should be provided with toilet facilities on each floor having classrooms.

Temporary workingmen facilities:

1	water closet and 1 urinal for each 30 workmen.
24-in.	urinal trough — 1 urinal
36-in.	urinal trough — 2 urinals
72-in.	urinal trough — 4 urinals

921.2 Approval.

Specialties requiring water and waste connections shall be submitted for approval of the Plumbing Official.

922 Minimum Facilities.

922.1

Wherever plumbing fixtures are installed, the minimum number of each type of fixture installed shall be in accordance with Table 922.2, unless otherwise specifically provided. (Note: See Appendix "H" for Department of Insurance Guidelines for determining total occupant content and division of occupants by percentage).

923 Water Heaters and Hot Water Storage Tanks. (Refer also to Section 1215.)

923.1 General

(a) Water heater is an appliance for supplying potable hot water for domestic or commercial purposes. It may be used for space heating if the water temperature does not exceed 150°F.

(b) All storage tanks and water heaters shall be clearly and indelibly marked showing the allowable safe working pressure.

923.2 Location.

(a) Water heaters should be so located to provide as short a run of hot water piping to fixtures as possible and accessible to all tenants or maintenance personnel, as the case may be.

(b) Water heaters and storage tanks shall be so located and connected that it will be readily accessible for observation, maintenance, servicing and replacement.

923.3 Prohibited Installations.

Water heaters (using solid, liquid or gas fuel) with the exception of those having sealed combustion systems, shall not be installed in bathrooms and bedrooms. However, water heaters of the automatic storage type may be installed as replacement in a bathroom, when specifically authorized by the administrative authority, provided they are properly vented and supplied with adequate combustion air.

Gas utilization equipment in residential garages shall be installed so that all burners and burner ignition devices are located not less than 18 inches above the floor. Gas appliances shall be located, or reasonably protected, so that they are not subject to physical damage by a moving vehicle. Sealed combustion system heaters may be installed on the floor of a residential garage.

923.4 Clearances.

Water heaters shall be positioned in relation to combustible construction as recommended by manufacturer.

923.5 Connections.

(a) A shut-off valve shall be provided in the cold water supply to each hot water heater or storage tank and shall be accessible on the same floor and within three (3) feet of the heater or tank.

(b) The method of connecting a circulating water heater to the tank shall assure proper circulation of water through the heater, and permit a safe and useful temperature of water to be drawn from the tank.

923.6 Safety Devices.

Refer to Section 1215.

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923.7 Sediment Drains.

A suitable water valve or cock, through which sediment may be drawn off or the heater or tank emptied, shall be installed at the bottom of the heater or tank.

923.8 Anti-Syphon Devices.

Means acceptable to the administrative authority shall be provided to prevent syphoning in any water heater or tank to which any water heater or tank is connected.

A cold water "dip" tube with a hole at the top or a vacuum relief valve installed in the cold water supply line above the top of the heater or tank may be acceptable for this purpose.

Bottom fed heaters or bottom fed tanks connected to water heaters shall have a vacuum relief valve installed.

The vacuum relief valve shall be in compliance with the appropriate Standard A.S.A. Z21.22.

924 Toilet Rooms and Water Fountains for the Physically Handicapped.

(See Volume I N. C. State Building Code Chapter 11X when those facilities are required and other reference sections applicable.)

924.1 Toilet Rooms

On every floor where toilet rooms are planned in buildings requiring accessibility, one toilet room for men and one toilet room for women shall have at least one fixture of each type provided, to meet the requirements of this Section. Each building shall have a minimum of 2% of total fixtures of each type to meet the requirements of this Section.

Where several toilet rooms with group facilities are provided on a floor, at least one toilet room per floor for men and one for women, if both are provided, shall have at least one fixture of each type to meet the requirements of Sections. (a) through (j).

Where toilet rooms do not have group facilities but are single individual toilet rooms, the toilet room itself shall be considered the toilet stall as well as a toilet room, and at least one such room for men and one such room for women shall meet the requirements of (a), (b)3, 4, 5, (c), (d), (e), (g), (h), (i), (j).

In small business establishments, a toilet stall, as described in 6(b), may be accepted as a toilet room with the lavatory in an adjacent space. The space adjacent to the small door shall have the "turn-around" space specified in (a).

(a) A minimum of 5 feet x 5 feet clear floor space shall be provided and the entrance door shall be located on one side of this clear width and open out or slide. Where total available floor space is a particularly crucial concern, and where toe space is provided under cabinets, toe space of no more than 6 inches in depth and a minimum of 8 $\frac{1}{2}$ inches in height on any one side, can be allowed to supplant part of the 5 feet x 5 feet clear floor space.

EXAMPLE: If toe space 8 $\frac{1}{2}$ inches in height and 6 inches in depth were provided under cabinets on two opposite sides of the toilet room, the remaining clear floor space in addition to the toe space is 4 feet x 4 feet. However, if the depth of the toe space is 12 inches on each of two opposite sides of a toilet room, the additional clear floor space would still have to be 4 feet x 4 feet.

CHAPTER X

HANGERS AND SUPPORTS

1001 General.

1001.1 General.

Piping in a plumbing system shall be installed without undue strains in stresses and provision shall be made for expansion, contraction, and structural settlement.

1002 Vertical Piping.

1002.1 Attachment.

Vertical piping shall be secured at sufficiently close intervals to keep the pipe in alignment and carry the weight of the pipe and contents.

1002.2 Cast-Iron Soil Pipe.

Cast-iron soil pipe shall be supported at the base and at each story level not to exceed 15-feet.

1002.3 Screwed Pipe.

Screwed pipe (S.P.S.) shall be supported at the base and at not less than every other story level not to exceed 30-feet.

1002.4 Copper and Stainless Steel Tube

Copper and stainless steel tube shall be supported at every story for piping 1½-inches and over and at not more than 4-foot intervals for piping 1¼-inches and smaller.

1002.5 Lead Pipe.

Lead pipe shall be supported at intervals not exceeding 4-feet.

1002.6 Borosilicate Glass.

Borosilicate glass shall be supported at intervals of eight to ten feet with a hanger or by a padded riser clamp under bottommost coupling in riser, restricting sideward as well as downward movement, at each floor for 3 inch and larger diameter pipe, and at every other floor for smaller diameter pipe. All hangers shall have a padding with $\frac{1}{4}$ " thick solid neoprene or Buna-N rubber.

1002.7 Glass.

Glass drainline shall be supported at every floor for 3", 4", and 6" diameter vertical runs and supported at every other floor for 1½" and 2" sizes. Use padded riser clamps.

1002.8 Plastic Pipe.

Semi-rigid plastic pipe, when allowed by Code, shall be supported at each story for piping 1½ inches and over and not more than 4 foot intervals for piping 1¼ inches and smaller based on the manufacturer's recommendations.

1002.9 Aluminum DWV Pipe.

Aluminum DWV pipe shall be supported at intervals not exceeding 15 feet.

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1003 Horizontal Piping.

1003.1 Supports.

Horizontal piping shall be supported at sufficiently close intervals to keep it in alignment and prevent sagging.

1003.2 Cast-Iron Soil Pipe.

Cast-iron soil pipe shall be supported at not more than 5 foot intervals on 5 foot lengths and 10 foot intervals on 10 foot lengths. Hangers shall be located as near hubs as possible.

1003.3 Screwed Pipe.

Screwed pipe (S.P.S.) shall be supported at approximately 12-foot intervals.

1003.4 Copper Tubing.

Copper tubing shall be supported at approximately 8-foot intervals for piping 1½-inches and smaller and 10-foot intervals for piping 2-inches and larger.

1003.5 Lead Pipe.

Lead pipe shall be supported by strips or otherwise for its entire length.

1003.6 In Ground.

Piping in the ground shall be laid on a firm bed for its entire length, except where support is otherwise provided which is adequate in the judgment of the Plumbing Official.

1003.7 Plastic Pipe.

Semi-rigid plastic pipe, when allowed by Code, shall be supported at intervals of not more than 5 feet.

1003.8 Borosilicate Glass.

Borosilicate glass, horizontal piping shall be supported at intervals of 8 to 10 feet with a hanger having a padding of $\frac{1}{4}$ " thick solid neoprene or Buna-N rubber. Glass drainline shall be supported in horizontal runs every eight to ten feet, never closer unless there are more than two joints in the 8-10 foot section. Use padded hangers, either clevis or trapeze type.

1003.9 Aluminum DWV Pipe

Aluminum DWV pipe shall be supported at intervals not exceeding 10 feet.

1004 Hangers and Anchors.

1004.1 Material.

Hangers and anchors shall be of metal of sufficient strength to maintain their proportional share of the pipe alignments and prevent rattling.

1004.2 Attachment.

Hangers and anchors shall be securely attached to the building construction.

1005 Piping in Concrete.

Piping in concrete or masonry walls or footings shall be placed or installed in chases or recesses which will permit access to the piping for repairs or replacement.

1006 Base of Stacks.

1006.1 Supports.

Bases of all soil stacks, waste and vent stacks, shall be supported to the satisfaction of the Plumbing Official.

1006.2 Piping Material.

Other piping material shall be so anchored as to take the load off the stack at the base.

(f) Provision shall be made to permit water on the building side of the reducing valve to flow back into the main when the building pressure exceeds the main supply pressure due to thermal expansion. Reducing valves with build-in by-pass check valves will be acceptable.

An integral by-pass check valve shall be capable of opening to permit a reverse flow of water through the reducing valve to prevent a build-up of system pressure by thermal expansion of the water with an increase of reduced pressure not exceeding 2 psi above the prevailing initial pressure.

(g) The valve shall be designed to fall open to permit uninterrupted water flow.

(h) All regulators and strainers must be so constructed and installed as to permit repair or removal of parts without breaking a pipe line or removing the valve and strainer from the pipe line.

1214 Hot-Water Distribution.

1214.1 Hot-Water Distribution Piping.

The sizing of the hot-water distribution piping shall conform to good engineering practice (See paragraph 1213.1).

1214.2 Hot Water Supply.

The hot water supply on any fixture requiring hot water shall be installed on the left side of the fixture unless otherwise specified by the manufacturer.

1214.3 Shower Water Temperature Control

"The temperature of hot water supplied to showers in all occupancies, except living units that have individual water heaters, shall be a maximum of 116°F or the shower shall be controlled by an anti-scald valve of the pressure balance or thermostatic mixing type. Multiple shower units may be controlled by a master anti-scald valve."

1215 Hot Water Tanks or Heaters and Safety Devices.

1215.1 General.

(a) All automatically fired water tanks shall be equipped with the following minimum controls and devices as applicable:

- (1) Operating temperature controls.
- (2) High Limit temperature control with maximum thermosetting of 210° F. (energy cut-off).
- (3) A positive flame failure cut-off.
- (4) Approved and listed burner and controls;
Gas-fired—American Gas Association.
Oil-fired—Underwriter's Laboratories.
- (5) An approved type pressure relief and temperature relief valves or and approved type combination thereof. New installations shall comply with General Statutes 66-27.1 (see appendix). Temperature relief ratings shall be in accordance with ASA standard Z21.22 (1958).

(b) No individual, firm, corporation, or business shall install, sell or offer for sale any automatic hot water tank or heater of 120 gallon capacity or less which does not have installed thereon by the manufacturer

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of such tank or heater an American Society of Mechanical Engineers and National Board of Boiler and Pressure Vessel Inspectors approved type pressure-temperature relief valve, and so labeled by the manufacturer's identification stamped or cast upon the tank or heater or upon a plate secured to it.

(c) Relief valves shall be connected to the top of the tank with the spindle vertical, if possible, either directly to a tapped or flanged opening in the tank, or to a fitting connected to the tank by a close nipple. The temperature sensing probe shall be actuated by the water within the top six inches of the tank and the relieving capacity of any one valve shall equal or exceed the heat (BTU's) input of the heater or to the storage tank. Relief Valve pressure setting shall not exceed the tank or heater manufacturer's rated working pressure and thermosetting shall not exceed 210° F.

Discharge piping from relief valves shall be of those materials listed in Section 1206.1(a). The piping shall not be smaller than the outlet of the relief valve. The termination of the piping shall not be threaded and shall be located 6 inches above the floor level. If the owner elects to extend the piping to the exterior of the building, the piping shall drain continuously downward and terminate in a location which will reduce the possibility of personal injury if the valve should discharge. Termination of piping in a crawl space is prohibited.

Water heaters located in attics or above ceilings shall be installed in safety drain pans. Safety pans shall be a minimum of 2 inches deep with a minimum $\frac{3}{4}$ " drain piped to discharge down to an open drain or piped to discharge outside the building. The relief valve discharge pipe shall terminate 6 inches above the bottom of the pan.

(d) For installation with a separate storage tank, relief valves shall be installed on the tank and there shall not be any type of valve installed between the water heater and the storage tank. When shut-off valves are provided between the heater and storage tank, additional approved type safety relief valve(s) shall be installed on the heater.

(e) Dip tubes, supply and hot water nipples, supply water baffles or heat traps when used in hot water supply storage tanks or heaters shall be constructed and tested to withstand a temperature of 400° F. without deteriorating in any manner, and the tank so labeled by the manufacturer.

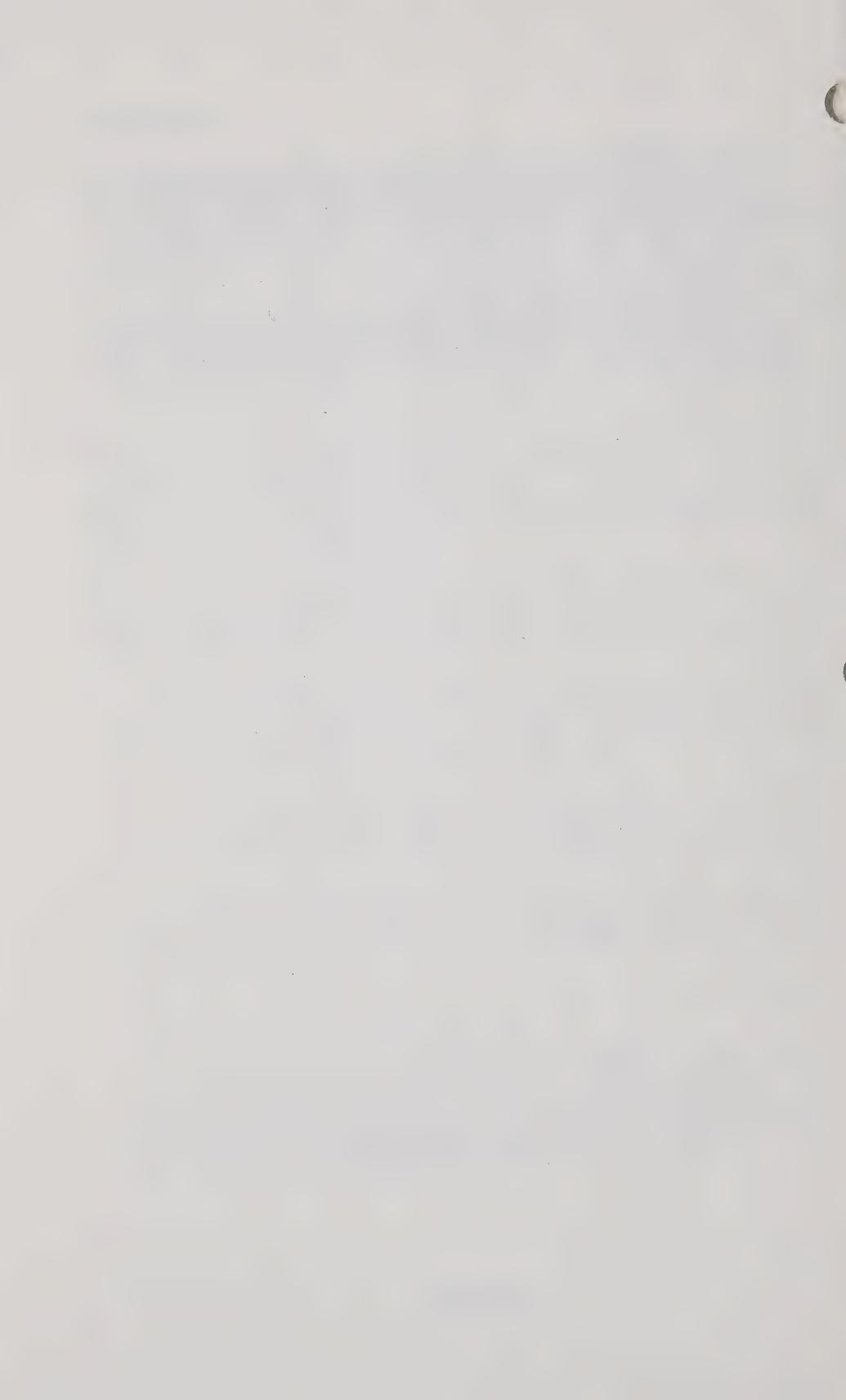
(f) Copper or steel coil tube type hot water supply heaters which are not covered by the ASME Boiler Code that have been designed and constructed as safe as otherwise provided in the ASME Code and are AGA or U. L. approved shall be equipped with approved safety devices as required by this section.

(g) A hot water supply or storage tank, fired or unfired, shall not be used for space heating if the water temperature exceeds 150° F.

(h) All storage tanks shall have clearly and indelibly stamped in metal, or so marked upon a plate welded thereto, or otherwise permanently attached, the maximum allowable working pressure. Such markings shall be in an accessible position outside of the tank so as to make inspection or reinspection readily possible. All storage tanks for domestic hot water shall meet the applicable ASME standards.

(i) All electric, gas and oil water heaters must be approved and listed by nationally recognized testing laboratories such as A.G.A., U.L., etc.; and all hot water tanks (fired or unfired) shall bear the ASME label of approval when required. The maximum allowable working pressure of a tank or heater shall in no case exceed the pressure indicated by the manufacturer's identification stamped upon the tank or upon a plate secured to it.

(j) Flue Connection—Each fired tank or fired coil heater shall be equipped with a minimum three inch diameter vent pipe or flue connected to an approved gas vent or chimney meeting the requirements of the State Building Code.



CHAPTER XIII

DRAINAGE SYSTEM

1301 Materials.

1301.1 General.

Pipe, tubing, and fittings for drainage systems shall comply with the provisions in Chapter V.

1301.2 Specific Type.

Standards given in Table 505 apply to the specific materials approved for use and as indicated in the various paragraphs in this chapter as they apply to the drainage system.

1301.3 Above-Ground Piping Within Buildings and Piping in Race Ways or Tunnels.

Soil and waste piping for drainage system shall be cast iron, galvanized steel, galvanized wrought iron, lead, brass, borosilicate glass, copper pipe, copper tube, copper alloy welded tube, stainless steel tube, schedule 40 ABS, Foam Core, PVC-DWV schedule 40 Cellular Core Pipe, or PVC-DWV as allowed in Section 504.2.

Cast iron soil pipe and fittings for soil, waste, vent conductors or building drains when above ground (unless otherwise specified) may be service weight.

(a) Vertical soil, waste and vent stacks shall be designed to control expansion and contraction, in accordance with accepted engineering practice, to the satisfaction of the administrative authority.

1301.4 Underground Piping Within Buildings.

All underground drains within buildings shall be cast iron soil pipe, lead, copper, heavy schedule borosilicate glass enclosed in polystyrene casing, PVC-DWV schedule 40 Cellular Core Pipe or plastic pipe as permitted in Table 505.

Black drainage and galvanized fittings may be used on drainage, waste and vents with galvanized pipe.

1301.5 Fittings.

Fittings on the drainage system shall conform to the type of piping used. Fittings on screwed pipe shall be of recessed drainage type. Black drainage and galvanized fittings may be used on drainage, waste and vents with galvanized pipe. (See Section 404).

Copper or cast copper alloy fittings shall be used with stainless steel tube.

1301.6 Acid Soil and Waste Piping.

For engineered acid soil and waste drainage systems the type of pipe shall be selected by a Professional Engineer registered in North Carolina. For non-engineered acid soil and waste drainage systems the piping shall be of a material

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which is designed and recommended by the manufacturer as suitable for the type of waste drained. Piping shall be installed in accordance with the manufacturer's installation instructions. When installed within buildings, piping of combustible materials shall be of a flame retardant type rated at least V-2 per UL-94. Concentrations of acid waste which are sufficient to adversely affect the conventional drainage system shall be suitably diluted or neutralized before interconnection (see also Section 1109.2). Fittings shall conform to the type of piping used.

Acid soil and waste piping within buildings when underground shall be heavy schedule borosilicate glass, heavy duty high silicon cast iron or schedule 40 Type II polypropylene with either wrapped or coated fittings on glass piping.

1302 Building Sewer.

1302.1 Separate Trenches.

The building sewer, when installed in a separate trench from the water service pipe, shall be cast iron sewer pipe, vitrified-clay sewer pipe, concrete sewer pipe, laminated bituminized fiber sewer pipe, asbestos sewer pipe, schedule 40 ABS, ABS Foam Core, PVC-DWV sewer pipe, PVC-DWV schedule 40 Cellular Core Pipe, or ABS composite sewer pipe. Joints shall be water tight and root proof and all materials shall be installed according to the manufacturer's recommendations. (see Appendix C) All pipe and fittings shall bear the manufacturer's name or trademark. Refer to Section 1206.4 for regulations governing the installation of the building sewer and/or drain and water service line in the same trench.

1302.2 Sewer in Filled Ground.

A building sewer or building drain installed in filled or unstable ground shall be of cast-iron pipe, except that nonmetallic drains may be laid upon the approved concrete pad if installed in accordance with paragraph 1302.1.

1302.3 Sanitary and Storm Sewers.

Where separate systems of sanitary drainage and storm drainage are installed in the same property, the sanitary and storm building sewers or drains may be laid side by side in one trench.

1302.4 Old House Sewers and Drains.

Old house sewers and house drains may be used in connection with new building or new plumbing and drainage work only when they are found, on examination and test, to conform in all respects to the requirements governing new house sewers, and the Plumbing Official shall notify the owner to make the changes necessary to conform to this Code.

1302.5

Cleanouts on building sewers shall be located as set forth under paragraph 704.

1303 Drainage Piping Installation.

1303.1 Horizontal Drainage Piping.

Horizontal drainage piping shall be installed at a uniform slope following the land surface contour but at slopes not less than permitted in paragraphs 1303.2, 1303.3, and 1303.4.

TABLE 1305.2 — BUILDING DRAINS AND SEWERS & HORIZONTAL BRANCH DRAINS

Diameter of Pipe	Maximum Number of Fixture-Units that may be Connected to Any Portion ¹ of the Building Drain or the Building Sewer ²			
	Fall Per Foot			
Inches	1/16-Inch	1/8-Inch	1/4-Inch	1/2-Inch
1 1/2				3 ⁴
2			21	26
2 1/2			24	31
3		20 ²	27 ²	36 ²
4		180	216	250
5		390	480	575
6		700	840	1,000
8	1,400	1,600	1,920	2,300
10	2,500	2,900	3,500	4,200
12	3,900	4,600	5,600	6,700
15	7,000	8,300	10,000	12,000

¹Includes branches of the building drain.²Not over two water closets.³No building sewer shall be less than 4-inches in size.⁴See Section 1305.7 for minimum pipe size permitted below grade.**TABLE 1305.3 — HORIZONTAL FIXTURE BRANCHES AND STACKS**

Diameter of Pipe	Maximum No. of Fixture Units That May Be Connected To:			
	Any Horizontal Fixture Branch	One Stack of 3 Stories in Height or 3 Intervals	More Than 3 Stories In Height	
			Total for Stack	Total at One Story or Branch Interval
Inches				
1 1/4	1	2	2	1
1 1/2	3	4	8	2
2	6	10	24	6
2 1/2	12	20	42	9
3	20 ²	30 ³	60 ³	16 ²
4	160	240	500	90
5	360	540	1,100	200
6	620	960	1,900	350
8	1,400	2,200	3,600	600
10	2,500	3,800	5,600	1,000
12	3,900	6,000	8,400	1,500
15	7,000

¹Does not include branches of the building drain.²Not over two water closets.³Not over six water closets.

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connected thereto except that a 4 x 3 W.C. connection shall not be considered as a reduction in pipe size.

1305.5 Minimum Size or Stack-Vent or Vent Stack.

Any structure to which a building drain is installed shall have at least one stack-vent or vent stack carried through the roof, size to be determined by Table 1305.3 and 1421.5, but not less than 3 inches diameter permitted.

1305.6 Future Fixtures.

When provision is made for the future installation of fixtures, those provided for shall be considered in determining the required sizes of drain pipes. Construction to provide for such future installation shall be terminated with a plugged fitting or fittings at the stack so as to form no dead end.

1305.7 Underground Drainage Piping.

No portion of the drainage system installed underground or below a basement or cellar shall be less than 2-inches in diameter.

1306 Offsets on Drainage Piping.

1306.1 Offsets of 45 Deg. or Less. (Five Stories or More)

An offset in a vertical stack, with a change of direction of 45 deg. or less from the vertical, may be sized as a straight vertical stack. In case a horizontal branch connects to the stack within 2-feet above or below the offset, a relief vent shall be installed in accordance with paragraph 1418.3.

1306.2 Waste Stacks Serving Kitchen Sinks.

In a one or two family dwelling only in which the waste stack or vent receives the discharge of a kitchen type sink and also serves as a vent for fixtures connected to the horizontal portion of the branch served by the waste stack, the minimum size of the waste stack up to the highest sink branch connection shall be 2-inches in diameter. Above that point the size of the stack shall be governed by the total number of fixture units vented by the stack.

1306.3 Above Highest Branch. (Five Stories or More)

An offset above the highest horizontal branch is an offset in the stack-vent and shall be considered only as it affects the developed length of the vent.

1306.4 Below Lowest Branch. (Five Stories or More)

In the case of an offset in a soil or waste stack below the lowest horizontal branch, no change in diameter of the stack because of the offset shall be required if it is made at an angle of not greater than 45 deg. If such an offset is made at an angle greater than 45 deg., the required diameter of the offset and the stack below it shall be determined as for a building drain. (Table 1305.2.)

CHAPTER XIV

VENTS AND VENTING

1401 Materials.

1401.1 Vents.

Pipe, tubing, and fittings for the vent piping system shall comply with the provisions in Chapter V.

1401.2 Specific Type.

Standards given in Table 505 apply to the specific materials approved for use and as indicated in the various paragraphs in this chapter as they apply to the venting system.

1401.3 Piping Above Ground.

Vent piping shall be cast iron, galvanized steel, galvanized wrought iron, lead, brass or copper pipe, copper tube, stainless steel tube or Schedule 40 ABS, ABS Foam Core, PVC-DWV Schedule 40 Cellular Core Pipe, or PVC-DWV, as allowed in Section 504.2.

1401.4 Piping Underground.

Vent piping placed underground shall be cast iron, copper tube of a weight no less than that of copper water tube Type L, Grade H stainless steel water tube or Schedule 40 ABS, ABS Foam Core, PVC-DWV Schedule 40 Cellular Core Pipe, or PVC DWV as allowed in Section 504.2, provided that other materials may be used for underground vents when found adequate and installed as directed by the plumbing official. Where threaded joints are approved for use underground, they shall be coated and wrapped after installation and tests.

1401.5 Fittings.

Fittings shall conform to the type of pipe used in the vent system as required by paragraph 1401.2 and 1401.3. Black drainage and galvanized malleable fittings may be used on drainage, waste and vent with galvanized pipe. Copper or cast copper alloy fittings shall be used with stainless steel tube.

1401.6 Acid System.

Vent piping on acid-waste systems shall conform to that required for acid-waste pipe, Section 1301.6.

1402 Protection of Trap Seals.

1402.1 Traps Protected.

The protection of trap seals from siphonage or back pressure shall be accomplished by the appropriate use of soil or waste stacks, vents, revents, back vents, loop vents, circuit or continuous vents, or combinations thereof, installed in accordance with the requirements of this chapter.

1403 Vent Stacks.

1403.1 Installation.

A vent stack or a main vent shall be installed with a soil or waste stack whenever back vents, relief vents, or other branch vents are required in two or more branch intervals.

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1403.2 Terminal.

The vent stack shall terminate independently above the roof of the building or shall be connected with the extension of the soil or waste stack (stack-vent) at least 6-inches above the flood-level rim of the highest fixture.

1403.3 Main Stack.

Every building in which plumbing is installed shall have at least one main vent stack or stack vent, which shall run undiminished in size and as directly as possible, from the building drain through to the open air above the roof. Vent shall be sized according to Table 1421.5 and be not less than 3-inches in diameter.

1404 Vent Terminals.

1404.1 Roof Extension.

Extensions of vent pipes through a roof shall be terminated at least 6-inches above it except that where a roof is to be used for any purpose other than weather protection, the vent extensions shall be run at least 5-feet above the roof.

1404.2 Flashings.

Each vent terminal shall be made watertight with the roof by proper flashing.

1404.3 Flag Poling.

Vent terminals shall not be used for the purpose of flag poling, TV aerials, or similar purposes, except when the piping has been anchored to the construction and approved as safe by the Plumbing Official.

1404.4 Location of Vent Terminal.

No vent terminal from a drainage system shall be directly beneath any door, window, or other ventilating opening of the building or of an adjacent building nor shall any such vent terminal be within 10-feet horizontally of such an opening unless it is at least 2-feet above the top of such opening.

1404.5 Extensions Through Wall.

Vent terminals extending through a wall, when approved by the Plumbing Official, shall be at least 10-feet horizontally from any lot line. They shall be turned to provide an opening downward. They shall be effectively screened and shall meet the requirements of paragraph 1404.4. Vent terminals shall not terminate under the overhang of the building.

1405 Frost Closure.

1405.1 Vent Terminal.

Where there is a possibility of frost closure, the vent extension through a roof shall be at least 3-inches in diameter. When it is found necessary to increase the size of the vent terminal, the change in diameter shall be made inside the building.

CHAPTER XV

STORM DRAINS

1501 General.

1501.1 Drainage Required.

Roofs, paved areas, yards, courts, and courtyards, shall be drained into a storm-sewer system or a combined-sewer system where such systems are available.

1501.2 Prohibited Drainage.

Storm water shall not be drained into sewers intended for sewage only.

1501.3 Traps.

Leaders and storm drains, when connected to a combined sewer, shall be trapped.

1501.4 Expansion Joints.

Expansion joints or sleeves shall be provided where warranted by temperature variations or physical conditions.

1501.5 Subsoil Drains.

Where subsoil drains are placed under the cellar or basement floor or are used to surround the outer walls of a building, they shall be made of open-jointed or horizontally split or perforated clay tile, or perforated bituminized fiber pipe or asbestos cement pipe, or ABS or PVC plastic pipe, when allowed by Code, meeting the requirements of Table 505 may be accepted, not less than 4-inches in diameter. When the building is subject to back-water, the subsoil drain shall be protected by an accessibly located back-water valve. Subsoil drains may discharge into a properly trapped area drain or sump. Such sumps do not require vents.

1501.6 Building Subdrains.

Building subdrains located below the public sewer level shall discharge into a sump or receiving tank the contents of which shall be automatically lifted and discharged into the drainage system as required for building sumps.

1502 Materials.

Note: Interior storm drain systems which utilize plastic pipe must use Schedule 40 ABS, ABS Foam Core, PVC-DWV Schedule 40 Cellular Core Pipe, or PVC DWV pipe and fittings meeting the requirements of Table 505.

Exterior storm water, area drains, subsoil drainage and septic tank fields may use lighter sewer grade ABS, ABS Foam Core or PVC.

1502.1 Inside Conductors.

Conductors placed within a building or run in a vent or pipe shaft shall be of cast-iron, galvanized steel, galvanized wrought-iron, galvanized ferrous alloys, brass, copper, lead, stainless steel tubing, ABS, ABS Foam Core, PVC-DWV Schedule 40 Cellular Core Pipe, PVC plastic pipe or Aluminum DWV when allowed by code, meeting the requirements of Table 505 may be accepted.

Section 1502

1502.2 Outside Leaders.

When outside leaders are of sheet metal and connected with a building storm drain or storm sewer, they shall be connected to a cast-iron drain extending above the finish grade, or the sheet-metal leader shall be protected against injury.

1502.3 Underground Storm Drains.

Building storm drains underground, inside the building shall be of cast iron soil pipe, Type "L" copper water tube or ABS, ABS Foam Core, PVC-DWV Schedule 40 Cellular Core Pipe, or PVC-DWV as required in Table 505.

1502.4 Building Storm Drains.

Building storm drains underground, inside the building, when not connected with a sanitary or combined sewer shall be of cast-iron soil pipe, Type "L" copper water tube or ferrous-alloy piping except that when approved by the Plumbing Authorities, vitrified-clay pipe, concrete pipe, ABS, ABS Foam Core, PVC-DWV Schedule 40 Cellular Core Pipe, or PVC plastic pipe, when allowed by Code, meeting the requirements of Table 505, bituminized-fiber pipe and asbestos-cement pipe, or stainless steel tube grade G may be used.

1502.5 Building Storm Sewers.

The building storm sewer shall be of cast-iron soil pipe, vitrified-clay pipe, concrete pipe, bituminized-fiber pipe, or asbestos-cement pipe ABS, PVC-DWV Schedule 40 Cellular Core Pipe, or PVC plastic pipe, when allowed by Code, meeting the requirements of Table 505.

1503 Traps.

1503.1 Main Trap.

Individual storm-water traps shall be installed on the storm-water drain branch serving each conductor, or a single trap shall be installed in the main storm drain just before its connection with the combined building sewer, main drain, or public sewer.

1503.2 Material.

Storm-water traps, when required, shall be of cast-iron.

1503.3

No traps shall be required for storm-water drains which are connected to a sewer carrying storm-water exclusively, except for floor drains.

1503.4

Traps for individual conductors shall be the same size as the horizontal drain to which they are connected.

1503.5

Conductor traps shall be so located that an accessible cleanout may be installed on the building side of the trap.

1504 Conductors and Connections.

1504.1

Conductor pipes shall not be used as soil, waste, or vent pipes, nor shall soil, waste, or vent pipes be used as conductors.

CHAPTER XVI

GAS PIPING

1601 Gas Piping.

Gas piping shall conform to standards set forth in National Fire Protection Association Pamphlet Number 54 entitled "Gas Appliances and Gas Piping, Installation of." (See Gas Piping Standards printed in back of this Volume.)

1602 Gas Piping Tables.

Natural Gas piping systems with initial pressure of 5 psig, use Table 2-D. Utilize Table 2-D for high pressure applications only. In using this table, no additional allowance is necessary for an ordinary number of fittings.

High Pressure Regulators: Venting of point delivery regulators into the gas equipment flue, combustion chamber or exhaust system is prohibited. The vent shall be designed to prevent the entry of water, insects or other foreign materials, that could cause blockage.

TABLE 2A
Maximum Capacity of Pipe in Cubic Feet of Gas per Hour
(Based upon a Pressure Drop of 0.3 Inch Water Column
and 0.6 Specific Gravity Gas)

Length Feet	Nominal Iron Pipe Size, Inches								
	½	¾	1	1¼	1½	2	2½	3	4
10	132	278	520	1,050	1,600	3,050	4,800	8,500	17,500
20	92	190	350	730	1,100	2,100	3,300	5,900	12,000
30	73	152	285	590	890	1,650	2,700	4,700	9,700
40	63	130	245	500	760	1,450	2,300	4,100	8,300
50	56	115	215	440	670	1,270	2,000	3,600	7,400
60	50	105	195	400	610	1,150	1,850	3,250	6,800
70	46	96	180	370	560	1,050	1,700	3,000	6,200
80	43	90	170	350	530	990	1,600	2,800	5,800
90	40	84	160	320	490	930	1,500	2,600	5,400
100	38	79	150	305	460	870	1,400	2,500	5,100
125	34	72	130	275	410	780	1,250	2,200	4,500
150	31	64	120	250	380	710	1,130	2,000	4,100
175	28	59	110	225	350	650	1,050	1,850	3,800
200	26	55	100	210	320	610	980	1,700	3,500

TABLE 2B
Maximum Capacity of Pipe in Cubic Feet of Gas per Hour.
 (Based upon a Pressure Drop of 0.5 Inch Water Column
 and 0.6 Specific Gravity Gas)

Length in Feet	Nominal Iron Pipe Size, Inches								
	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
10	175	360	680	1,400	2,100	3,950	6,300	11,000	23,000
20	120	250	465	950	1,460	2,750	4,350	7,700	15,800
30	97	200	375	770	1,180	2,200	3,520	6,250	12,800
40	82	170	320	660	990	1,900	3,000	5,300	10,900
50	73	151	285	580	900	1,680	2,650	4,750	9,700
60	66	138	260	530	810	1,520	2,400	4,300	8,800
70	61	125	240	490	750	1,400	2,250	3,900	8,100
80	57	118	220	460	690	1,300	2,050	3,700	7,500
90	53	110	205	430	650	1,220	1,950	3,450	7,200
100	50	103	195	400	620	1,150	1,850	3,250	6,700
125	44	93	175	360	550	1,020	1,650	2,950	6,000
150	40	84	160	325	500	950	1,500	2,650	5,500
175	37	77	145	300	460	850	1,370	2,450	5,000
200	35	72	135	280	430	800	1,280	2,280	4,600

TABLE 2C
Maximum Capacity of Semirigid Tubing in Cubic Feet of Gas per Hour
 (Based on a Pressure Drop of 0.3 Inch Water Column
 and 0.6 Specific Gravity Gas)

Outside Diameter (Inches)	Length of Tubing (Feet)									
	10	20	30	40	50	60	70	80	90	100
3/8	19	12	10	9	—	—	—	—	—	—
1/2	45	30	24	20	18	17	15	14	13	12
5/8	97	64	52	44	38	35	32	30	28	26
3/4	161	105	88	71	64	59	54	50	46	44
7/8	245	169	135	114	97	91	80	75	71	67

TABLE 2D
Pipe Sizing Table for a 5 Pounds Pressure
Capacity of Pipes of Different Diameters and Lengths in
Cubic Feet per Hour for an Initial Pressure of 5.0 Psig with a
10 Percent Pressure Drop and a Gas of 0.6 Specific Gravity

Pipe size of Schedule 40 Standard Pipe (Inches)	Internal Diameter (Inches)	Total Equivalent Length of Pipe in Feet										
		50	100	150	200	250	300	400	500	1000	1500	2000
0.75	0.824	1056	726	583	499	442	401	343	304	209	168	144
1.00	1.049	1989	1367	1098	940	833	755	646	572	393	316	270
1.25	1.380	4084	2807	2254	1929	1710	1549	1326	1175	808	649	555
1.50	1.610	6120	4206	3378	2891	2562	2321	1987	1761	1210	972	832
2.00	2.067	11786	8101	6505	5567	4934	4471	3827	3391	2331	1872	1602
2.50	2.469	18785	12911	10368	8874	7865	7126	6099	5405	3715	2983	2553
3.00	3.068	33209	22824	18329	15687	13903	12597	10782	9556	6568	5274	4514
3.50	3.548	48623	33418	26836	22968	20356	18444	15786	13991	9616	7722	6609
4.00	4.026	67736	46555	37385	31997	28258	25694	21991	19490	13396	10757	9207
5.00	5.047	122544	84224	67635	57887	51304	46485	39785	35261	24235	19461	16656
6.00	6.065	198427	136378	109516	93732	83073	75270	64421	57095	39241	31512	26970
8.00	7.981	407692	280204	225014	192583	170683	154651	132361	117309	80626	64745	55414
10.00	10.020	740477	508926	408686	349782	310005	280887	240403	213065	146438	117595	100646
12.00	11.938	1172269	805694	647001	553749	490777	444680	380588	337309	231830	186168	159336

